

A HOLISTIC APPROACH TO THE DUAL CAREER OF THE STUDENT-ATHLETE

***María José Maciá-Andreu
María T. Morales-Belando
Lourdes Meroño
Antonio Sánchez-Pato
Juan Alfonso García-Roca***
Editors

 *Dykinson, S.L.*

This book has been reviewed by our Editorial Board.
For more information, see www.dykinson.com/quienes_somos

© The editors
Madrid, 2023

Editorial DYKINSON, S.L. Meléndez Valdés, 61 - 28015 Madrid
Telephone (+34) 91544 28 46 - (+34) 91544 28 69
e-mail: info@dykinson.com
<http://www.dykinson.es>
<http://www.dykinson.com>

ISBN: 978-84-1170-486-1
DOI: 10.14679/2132

Preprint:
Besing Servicios Gráficos, S.L.
besingsg@gmail.com

Empowering Excellence: AI-Enhanced Tutorship for Student Athletes in Higher Education

EMANUELE ISIDORI¹, SONIA MARÍA MARTÍNEZ CASTRO² & ANTONIO SÁNCHEZ-PATO³

¹ *Department of Movement, Humanities and Health Sciences, University of Rome Foro Italico, Italy*

² *Faculty of Education, International University of La Rioja, Spain*

³ *Faculty of Health Sciences, International University of La Rioja, Spain*

DOI: 10.14679/2144

Abstract

This chapter explores the intersection of sports dual career and higher education, focusing on how Artificial Intelligence (AI) can be harnessed to support student-athletes in their academic and athletic pursuits. Student-athletes often face balancing their time between sports commitments and academic responsibilities. Leveraging AI technologies can help address these challenges effectively. The article overviews AI, its applications, and its transformative potential. Specifically, it delves into how AI can revolutionize student-athlete support in higher education. AI-based learning platforms offer flexible and personalized educational solutions, catering to diverse learning styles and paces. AI tutoring systems can aid in managing academic pressures and improving performance of the student-athlete. The chapter further emphasizes how AI can provide valuable insights to faculty members about the unique challenges faced by student-athletes, fostering a more supportive learning environment. Furthermore, using AI enables the creation of specialized peer support networks tailored to student-athletes' needs. This collaborative approach can significantly enhance their overall university experience. In conclusion, by integrating AI technology into higher education, we can empower student-athletes, enabling them to achieve excellence both on and off the field.

Keywords: student-athletes, artificial intelligence (AI), tutorship, dual career, higher education.

1. Introduction

Artificial Intelligence (AI), a diverse domain within computer science, is devoted to developing systems that can execute tasks typically necessitating human intelligence. These tasks include learning and adapting to new information or environments, understanding and responding to natural language, recognizing patterns, problem-solving, and decision-making. AI can be categorized into two types: Narrow AI, designed to perform a specific task such as voice recognition, and General AI, which can theoretically perform any intellectual task that a human being can.

Artificial intelligence applications permeate a wide range of sectors. For instance, in healthcare, AI aids in identifying diseases, tailoring medicine, and pioneering drug discovery, employing machine learning algorithms to predict or make decisions rooted in extensive patient data sets. In the financial sector, AI plays a crucial role in flagging fraudulent transactions, overseeing investments, and delivering customer services via AI-powered chatbots (Halaweh, 2023).

In transportation, autonomous vehicles use AI to interpret sensor data, navigate the road, and avoid obstacles. In education, AI can personalize learning content based on individual student needs, identify learning gaps, and provide feedback. In entertainment, AI is used in gaming, movie recommendations, and virtual reality. AI also plays a role in security and defence, aiding facial recognition systems and autonomous drones. From streamlining monotonous tasks and delivering customer service via chatbots to sophisticated predictive analytics, the scope of artificial intelligence in business is vast (Finley, 2023). AI's ability to process and analyze vast amounts of data also makes it invaluable in scientific research, where it is used in climate modelling, genetic research, and space exploration, among other fields. While AI has vast potential, it also presents ethical considerations and challenges, including data privacy, job displacement due to automation, and algorithmic biases. As AI evolves, these factors will play an increasingly central role in discussions about integrating and regulating AI technology (Iliescu et al., 2022).

AI has found significant applications across numerous sectors, including education. In education, AI is revolutionizing teaching and learning processes in profound ways. For instance, adaptive learning platforms can tailor educational content to meet each student's unique needs, fostering a more personalized and efficient learning experience. These systems can evaluate a student's understanding, identify areas of weakness, and then adapt the instructional material accordingly.

Furthermore, AI can automate administrative tasks, saving educational institutions time and resources. Tasks such as grading assignments and scheduling can be streamlined with AI, freeing teachers to focus more on instruction and student interaction. AI-powered chatbots and virtual tutors are also becoming increasingly prevalent. These tools can offer round-the-clock assistance, answering students' questions and explaining complex topics, enhancing learning. Moreover, they can learn from each interaction, continuously improving their support (Saqib et al., 2023).

AI is also assisting in predicting student outcomes and early detection of at-risk students. By analyzing vast amounts of data, predictive AI models can identify patterns that indicate a student might be struggling academically, allowing educators to intervene proactively.

In higher education, AI has been used in the recruitment process by analyzing and predicting enrollment patterns and even in research, where AI can process and analyze massive datasets in a way that would be otherwise impossible for humans. Despite its numerous benefits, AI's application in education comes with challenges, such as data privacy issues, the digital divide in accessing AI-based resources, and the need for careful implementation to avoid replacing the irreplaceable human touch in education. As we continue integrating AI into our education systems, these considerations will play a crucial role in shaping how we utilize this powerful technology to enhance learning while preserving essential human values. Artificial Intelligence (AI) swiftly alters the education landscape, offering innovative tools and methods to personalize and enhance the learning experience. Among these advancements, the potential of AI in tutoring for student-athletes is particularly significant (Zhu et al., 2023).

University student-athletes represent a unique demographic that requires flexible, tailored educational solutions due to their dual

commitments to academics and sports. Balancing the rigorous demands of athletic training and competition with pursuing academic excellence can be challenging (Isidori, 2015). That is where AI technology, specifically in the form of AI-powered tutoring, comes into play.

AI tutoring systems are built upon complex algorithms that learn from interactions, providing personalized guidance and resources. They are designed to adapt their instructional strategies based on the learner's needs, strengths, weaknesses, and pace of learning. This personalized approach is critical for student-athletes as it allows for flexible learning schedules that accommodate their often irregular and demanding training times (Dilekci & Karatay, 2023). These systems can offer round-the-clock assistance, a feature particularly beneficial for student-athletes who may need to study at unconventional hours due to their athletic commitments. AI tutors can provide instant feedback, clarify doubts, and guide students through complex concepts at any time of the day.

Moreover, AI tutoring systems can track a student's progress over time, identifying areas of improvement and those requiring additional attention. This ability can help student-athletes stay on top of their academic performance, even when their focus might be divided between sports and studies. Beyond personalized learning experiences, AI has the potential to enhance the athletic component of a student-athlete's life. AI can be used in sports training programs to analyze performance data, assist in designing training regimens, and even help prevent injuries by identifying potential risk factors.

Furthermore, AI can be instrumental in career guidance for student-athletes, helping them navigate the possibilities of professional athletics and traditional career paths post-graduation. AI systems can provide information about potential career trajectories, making predictions based on performance statistics, academic interests, and market trends.

2. Challenges in student-athlete education

Student-athletes face a distinct set of challenges in managing their dual career pathways. Balancing rigorous academic and athletic

commitments requires exceptional time-management skills, resilience, and determination (Conde et al., 2021).

One primary challenge student-athletes face is their schedules' demanding and often unpredictable nature. Athletic training, travel for competitions, and recovery periods can consume significant time, making it difficult to align with traditional educational programs' rigid structures and schedules. That could lead to student-athletes needing help to attend classes, study sessions, or complete assignments on time.

Additionally, the physical and mental demands of intense athletic training and competition can leave student-athletes with less energy for academic pursuits. The stress associated with maintaining competitive athletic performance and good academic standing can also lead to mental health challenges, including anxiety and burnout.

Cultural and institutional factors also play a part. Universities often emphasize the athletic achievements of these students, sometimes leading to a culture that undervalues their academic pursuits. That can make it challenging for student-athletes to seek and receive the academic support they need (Conde et al. 2023).

Student-athletes face specific challenges in managing their academic and athletic commitments. These challenges include:

- *Time Management.* Balancing the demanding schedules of training, competitions, and classes can be overwhelming for student-athletes. They often have limited time for studying, attending lectures, and completing assignments.
- *Fatigue and Exhaustion.* The physical demands of their sport can leave student-athletes physically exhausted, making it challenging to stay focused and perform well academically.
- *Travel and Missed Classes.* Frequent travel for competitions can result in missed classes, making it challenging to keep up with coursework and stay on track academically.
- *Academic Pressure.* Student-athletes may experience extra academic stress as they are expected to uphold high academic standards to continue their eligibility in their chosen sport.

- *Limited Social Life.* The demanding schedules of student-athletes often need more time for social activities and building relationships outside their sport.
- *Financial Burden.* Balancing the financial demands of college education and expenses related to their sport can be a significant challenge for student-athletes.
- *Lack of Support.* Some student-athletes may need more support systems to help them navigate their challenges, including academic advisors, tutors, or mentors who understand their unique circumstances.

All these challenges can impact student-athletes overall well-being, academic performance, and athletic success. Therefore, it is crucial to provide them with appropriate resources and support to help them effectively manage their academic and athletic commitments. Artificial Intelligence (AI) offers possibilities to help manage these challenges. AI-based learning platforms can provide flexible and personalized education solutions. These platforms can adapt to the unique schedules of student-athletes, allowing them to learn at their own pace, at any time, and from anywhere. For instance, a student-athlete could study on a bus during a road trip for an away game using an AI-based platform.

AI can also create a personalized curriculum based on each student's learning style, pace, and current understanding of the course material. By identifying a student's strengths and areas for improvement, AI platforms can deliver custom-tailored content and assignments, making learning more efficient.

Moreover, AI-driven data analytics can track and analyze academic and athletic performance, providing insights to help student-athletes, coaches, and academic advisors make informed decisions. For example, predictive analytics could highlight when a student-athlete's academic performance might be at risk due to their athletic commitments, enabling early intervention.

In the realm of athletics, AI can provide innovative training solutions. AI technologies can monitor an athlete's performance, providing real-

time feedback, suggesting personalized training routines, and even predicting injury risks based on the athlete's physical data.

By integrating AI into the dual career pathway of student-athletes, we can create an environment that better supports their unique needs and ambitions, fostering their success in both athletic and academic fields.

University student-athletes face the unique task of balancing a rigorous academic curriculum with demanding athletic training schedules. This balancing act often results in time constraints, unpredictable schedules, and high physical and mental stress levels. Given this reality, there is a critical need for personalized and flexible learning approaches that can accommodate the particular needs of student-athletes.

1. Firstly, personalized learning approaches are essential to ensure that each student-athlete can work at a pace that suits their learning style and complements their athletic commitments. These methods can consider the learner's strengths and weaknesses, enabling them to focus on areas that need improvement rather than following a generic curriculum. That is crucial for student-athletes, whose time is a premium resource. Student-athletes can optimize their learning efficiency by targeting areas that require the most attention.
2. Next, flexibility in learning is vital due to the irregular schedules student-athletes often maintain. They must frequently travel for games and competitions and adhere to intense training regimens, making it challenging to attend traditional classroom sessions consistently. Flexible learning models allow student-athletes to access educational content and resources at any time and location, enabling them to learn when most convenient.

AI-based learning platforms are excellent for providing personalized and flexible learning experiences. They can adapt to each student's learning style, track their progress, and tailor the curriculum. Moreover, they offer the ability to learn at any time and from anywhere, accommodating the unique and often unpredictable schedules of student-athletes.

Additionally, AI platforms can provide immediate feedback, allowing student-athletes to correct misunderstandings and reinforce learning promptly. This immediate response is often not feasible in a traditional classroom setting but is highly beneficial in maintaining the pace of learning.

By recognizing and addressing the unique challenges faced by student-athletes, universities can employ personalized and flexible learning approaches that accommodate these students' dual commitments. The effective integration of these approaches supports student-athletes in managing their academic and athletic responsibilities and fosters an environment where they can thrive in both arenas.

3. Role of AI in tutoring student-athletes

Artificial Intelligence (AI) can significantly enhance the academic experiences of student-athletes at universities, mainly through its potential to deliver tailored content and unique learning experiences, as we have said above. One of the most impactful applications of AI is in the realm of adaptive learning. Platforms like *DreamBox Learning* and *Knewton employ*⁶ AI to analyze students' performance in real-time and modify the curriculum based on their needs. For example, suppose a student-athlete is grappling with calculus. In that case, the system identifies this hurdle and provides additional resources, explanatory content, and practice problems, allowing students to master the challenging topic quickly.

Beyond adaptive learning, the flexibility of AI tutoring systems is another significant advantage. Unlike traditional tutoring that adheres to set schedules, AI-powered platforms such as *Coursera*⁷ and *Khan Academy*⁸ offer self-paced courses accessible at any time. This round-the-clock availability is vital for student-athletes, whose demanding

⁶ For further information: <https://www.dreambox.com/>; <https://www.knewton.com/>.

⁷ <https://www.coursera.org/>.

⁸ <https://www.khanacademy.org/>.

athletic training and competition schedules often conflict with traditional educational timeframes. AI's capability to provide instant feedback and assessment is another boon to the learning process. Platforms such as *Turnitin*⁹, renowned for their plagiarism-checking capabilities, leverage AI to offer grammar and style suggestions, helping student-athletes refine their writing skills and correct mistakes promptly (Dergaa et al. 2023). Furthermore, the predictive power of AI can be harnessed to anticipate academic performance and potential roadblocks in learning. Analytical platforms like *BrightBytes*¹⁰ can evaluate student data to foresee possible performance issues, enabling early intervention to prevent falling grades.

Finally, when combined with Virtual Reality (VR), AI can offer immersive learning and training experiences. Platforms like *STRIVR*¹¹ provide VR training experiences used by professional sports teams and corporations, presenting student-athletes with opportunities to practice physical drills and academic concepts in an interactive, engaging environment.

Integrating AI into the tutoring process for student-athletes offers more than just personalized academic content. It also ensures flexibility in learning, prompt feedback, predictive performance analytics, and innovative training methodologies. Embracing these technologies allows universities to provide comprehensive, tailored learning experiences that genuinely accommodate the dual commitments of student-athletes. In higher education, particularly for student-athletes, artificial intelligence (AI) applications like adaptive learning systems and virtual coaching assistants are revolutionizing how these individuals learn and train.

9 <https://www.turnitin.com/>.

10 <https://www.brightbytes.net/>.

11 <https://www.strivr.com/>. The platform enhances learning experiences, merging the boundaries between traditional learning and on-the-job proficiency. Born out of collaboration with Stanford University's pioneering Virtual Human Interaction Lab, Strivr integrates cutting-edge research in cognitive science and human behavior. This scientifically grounded approach empowers the platform to boost employee engagement significantly and fortify knowledge retention, thus ensuring a well-equipped and long-serving workforce.

Adaptive learning systems, such as *ALEKS*¹², are leveraging the power of AI to provide highly personalized educational experiences. These systems analyze a student's engagement, performance, and learning speed in real-time, adjusting the difficulty level, pace, and even the nature of content based on the student's specific needs. If, for instance, a student-athlete consistently struggles with a topic like organic chemistry, the system identifies this issue. It provides additional resources and practice problems or adjusts how the information is presented to better align with the learner's style.

This level of customization helps student-athletes focus on areas where improvement is needed, allowing them to learn at their own pace without the pressure of keeping up with a one-size-fits-all curriculum. The 24/7 availability of these platforms is also particularly beneficial for student-athletes, whose schedules are often packed with training sessions and competitions. The flexibility offered by adaptive learning systems means that student-athletes can access high-quality, tailored educational content at a time that suits them best, be it early morning or late at night.

On the athletic side, AI-driven virtual coaching assistants, such as *Zone7*¹³ or *CoachNow*¹⁴, are changing the landscape of athletic training. These tools collect and analyze extensive performance data, from running speed and heart rate to nutrition and sleep patterns. This comprehensive analysis allows the virtual coaching assistant to provide personalized feedback and training recommendations. For instance, if a swimmer's data indicates a slower stroke rate than usual, the AI assistant might suggest specific drills to improve stroke efficiency or recommend a nutritional adjustment to boost energy levels.

Moreover, some of these AI-driven coaching tools are capable of predictive analytics, which means they can anticipate potential injuries based on the collected data. They might suggest specific preventative measures, such as periods of rest, physiotherapy exercises,

12 The platform can be accessed at the following link: <https://www.aleks.com/>.

13 <https://zone7.ai/>.

14 <https://coachnow.io/>.

or adjustments in training intensity. This functionality is invaluable in helping student-athletes maintain their physical well-being and avoid injuries, which can detrimentally impact their sporting and academic commitments.

AI's application to sports analytics can also benefit team sports. Tools such as *Catapult Sports*¹⁵ offer detailed performance analytics to help coaches devise better game strategies and make data-driven decisions about team lineups.

In summary, AI applications like adaptive learning systems and virtual coaching assistants dramatically improve university student-athletes' educational and athletic experiences. By offering tailored, flexible academic support, and data-driven training insights, these technologies are becoming integral to the holistic development of student-athletes, aiding their dual career paths and helping them excel both in the classroom and their sport.

4. Benefits of AI tutorship in university sports programs

Implementing AI tutorship in university sports programs provides several distinct advantages, significantly improving student-athletes academic performance and athlete development.

Firstly, AI-enhanced tutorship can dramatically improve academic performance. Using AI algorithms, adaptive learning platforms can deliver personalized learning experiences tailored to each student-athlete's needs. These systems can analyze student learning patterns, identify areas of difficulty, and subsequently adjust the teaching approach and content to suit the learner's needs better. This level of personalization allows for more effective learning, thereby enhancing academic performance.

Secondly, AI tutorship can greatly aid athlete development. Virtual coaching assistants and AI-driven analytics tools can monitor

¹⁵ <https://www.catapult.com/>.

an athlete's performance, providing personalized feedback based on comprehensive data analysis. This data-driven feedback is invaluable for identifying strengths and weaknesses, designing tailored training regimes, and monitoring progress.

Additionally, some AI systems are capable of predictive analytics, which can help anticipate potential injuries based on athlete performance data patterns. This predictive capability enables proactive injury prevention, ensuring student-athletes maintain their physical health and maximize their athletic performance.

On a broader scale, integrating AI into university sports programs can also aid the recruitment process. AI can analyze a vast array of data about potential recruits, from athletic performance metrics to academic achievements, helping coaches make informed, data-driven decisions about recruitment. Using AI in university sports programs can give universities a competitive edge, attract top athletic and academic talent, and encourage a culture of continuous learning and development (Zhou, 2021). Implementing AI tutorship in university sports programs presents significant advantages. It enables a highly personalized, flexible learning experience to enhance academic performance, provides data-driven insights for athlete development, and contributes to an innovative learning and training environment. By harnessing these benefits, universities can effectively support the dual career paths of student-athletes, helping them succeed both in the classroom and on the playing field.

Moreover, to address the specific challenges we have identified in the previous paragraph and faced by student-athletes, universities can leverage artificial intelligence (AI) in the following ways:

- *Flexible Scheduling:* AI-powered scheduling systems can help student-athletes manage their time more efficiently by creating personalized schedules that accommodate their athletic and academic commitments.
- *Communication and Collaboration:* AI technology can facilitate seamless communication and collaboration between different departments, such as coaches, academic advisors,

- and professors. That ensures that everyone is on the same page regarding a student-athlete's schedule and academic progress-
- *Mental Health Resources*: AI-powered chatbots and virtual assistants can be implemented to provide mental health support and resources to student-athletes. These AI systems can offer guidance and resources and even detect signs of mental health struggles, prompting appropriate intervention.
 - *Financial Assistance*: AI algorithms can analyze financial data and identify potential scholarship opportunities, grants, or financial aid programs that student-athletes may be eligible. That can help alleviate the financial burden and make education more accessible.
 - *Raising Faculty Awareness*: AI can provide faculty members with insights into the unique challenges student-athletes face. This awareness can lead to more understanding and support from professors, allowing for flexible deadlines or alternative learning options when necessary.
 - *Peer Support Networks*: AI can facilitate the creation of peer support networks designed explicitly for student-athletes. These networks can connect athletes from different sports and provide a platform for sharing experiences, advice, and strategies for academic success.

By implementing these AI-driven strategies, universities can provide the necessary resources and support to help student-athletes effectively manage their academic and athletic commitments, leading to overall success and well-being. This thing explicitly enhances the retention rate of student-athletes at universities. With the ever-increasing demands on universities to provide top-notch services and experiences for their students, AI offers many opportunities to enhance athlete retention and student satisfaction on campus. By leveraging AI-powered solutions, universities can address critical challenges, personalize student experiences, and create a supportive environment that fosters athletic excellence and student success.

One of the most significant advantages of AI in universities is its ability to provide personalized support to athletes and students. For

student-athletes, AI can aid in identifying areas where they require additional academic and athletic support. For instance, AI-powered tutoring systems can provide customized study plans based on a student's learning style and performance, optimizing their academic progress. Similarly, AI can analyze athletes' training data and recommend personalized workout routines and nutrition plans to improve their athletic performance.

AI excels in predictive analytics, enabling universities to anticipate challenges and intervene proactively. By analyzing historical data, AI models can forecast potential issues that could hinder athlete retention and student satisfaction. These could include academic struggles, social integration problems, or mental health concerns.

When universities employ predictive analytics, they can develop early intervention strategies to support students before problems escalate. For example, suppose AI identifies a student at risk of dropping out due to academic difficulties. In that case, the university's support team can promptly step in and offer additional academic resources or counselling.

Effective communication is paramount in fostering student satisfaction and athlete retention. AI-powered chatbots and virtual assistants can be vital in maintaining constant and immediate communication with students. These AI tools can answer frequently asked questions, guide students to relevant resources, and offer timely reminders about important deadlines or events.

For student-athletes, AI-powered communication channels can facilitate seamless interactions between athletes, coaches, and support staff. This efficient communication can lead to better coordination of training schedules, injury management, and overall team morale.

Universities with robust athletic programs can leverage AI to optimize talent identification and development processes. AI algorithms can analyze performance data, match it with specific athletic requirements, and precisely identify promising athletes. This data-driven approach reduces bias and ensures that talented individuals are noticed.

Additionally, AI can assist in creating tailored training plans based on an athlete's strengths and weaknesses. Through continuous analysis, AI can tailor training routines to maximize performance and minimize the potential for injuries.

AI-powered VR and AR technologies open exciting athlete training and skill development possibilities. By simulating real-game scenarios, these immersive experiences can help athletes refine their techniques, decision-making abilities, and situational awareness. That enhances athletic performance and contributes to heightened satisfaction and engagement among student-athletes.

As AI advances, its potential to enhance athlete retention and student satisfaction in universities becomes increasingly evident. By providing personalized support, leveraging predictive analytics, facilitating communication, and utilizing cutting-edge technologies, universities can create an environment where student-athletes thrive academically, athletically, and personally. Embracing AI in higher education is a forward-thinking approach and a strategic investment in the success and satisfaction of athletes and students. As universities integrate AI-driven solutions into their campuses, they position themselves at the forefront of innovation, ensuring a brighter future for their students and athletes.

5. Ethical considerations and limitations

Integrating AI in university tutorship for student-athletes presents promising opportunities to enhance learning and athletic performance. However, this advancement also raises significant ethical concerns that must be addressed to ensure a fair, safe, and inclusive educational environment (Kasneci et al., 2023). The ethical implications of using AI in tutoring student-athletes, focusing on data privacy and the potential for algorithmic biases, are essential. By recognizing these concerns and implementing ethical guidelines, universities can maximize AI's benefits while safeguarding their student-athletes well-being and rights.

AI tutorship heavily relies on collecting and analyzing vast amounts of data, including academic records, training performance, and

personal information about student-athletes. This data is essential for providing personalized support and identifying areas of improvement. However, handling sensitive information requires careful consideration of data privacy and security.

Universities must prioritize protecting student-athletes data through robust encryption, secure storage, and limited access rights. Additionally, explicit consent must be obtained from each student-athlete before collecting their data, and they should be fully informed about how their information will be used. Furthermore, anonymization techniques should be applied whenever possible to minimize the risk of data breaches or unauthorized access.

AI algorithms used in tutorship can be complex and challenging to understand for non-experts, including student-athletes. The opaqueness in the decision-making process of AI could result in diminished trust and could put specific individuals at a disadvantage. Universities must prioritize explainable AI models, ensuring students and coaches can comprehend the reasoning behind AI-driven recommendations and decisions.

Transparency should extend beyond the algorithms themselves. Students and athletes should be aware of the factors and data sources used to assess their progress, areas of improvement, and performance predictions. Clear communication about the role of AI in their educational journey is essential to foster trust and ensure that student-athletes remain in control of their learning experience (Shaw et al., 2023).

AI algorithms are not immune to biases and may perpetuate and even exacerbate existing inequalities. In the context of AI tutorship for student-athletes, biases may manifest in various ways, such as favouring specific sports disciplines, demographics, or learning styles. Algorithmic biases could lead to unequal student-athlete opportunities and reinforce stereotypes or discrimination. To mitigate biases, universities must ensure diverse and inclusive data sets are used in AI model development. Frequent assessments ought to be conducted to evaluate the algorithms' fairness and efficiency across various groups of student-athletes. If

biases are identified, universities should take proactive steps to rectify them and recalibrate the AI models to ensure equitable support for all.

While AI can provide valuable insights and support, it should never replace human oversight and intervention. Human mentors, coaches, and educators play critical roles in student-athletes development, providing emotional support, motivation, and moral guidance that AI cannot replicate. Universities should balance AI-driven tutorship and human interaction, ensuring students can access human mentors who can interpret AI recommendations and provide holistic support. This collaborative approach helps prevent overreliance on AI and ensures that students' emotional and social needs are adequately addressed.

AI tutorship holds immense potential for transforming the educational experience of student-athletes at universities. However, the ethical considerations surrounding data privacy, algorithmic biases, transparency, and human oversight are of paramount importance. By prioritizing students' data privacy, fostering transparency in AI decision-making, addressing biases, and maintaining human intervention, universities can harness the power of AI responsibly and ethically. Integrating AI into tutorship while upholding ethical principles will create an environment where student-athletes thrive academically, athletically, and ethically.

As universities embrace AI in tutorship for student-athletes, it is essential to acknowledge the limitations and challenges of this technological advancement. While AI offers numerous benefits, there are areas where human interaction remains crucial, and resistance to technology adoption may arise among student-athletes and universities. Building rapport, empathy, and trust are essential to mentorship and coaching, which are best achieved through face-to-face communication (Passmore & Tee, 2023).

Student-athletes often seek guidance beyond academic and athletic challenges, and human mentors can provide emotional support and motivation that AI may not fully grasp. Universities must recognize the vital role of human mentors and coaches in fostering a sense of belonging and community among student-athletes. Integrating AI

should complement, not replace, human interaction to ensure a well-rounded educational journey.

Resistance to technology adoption is not uncommon, and it can present a challenge when introducing AI tutorship to universities and student-athletes. Some individuals may fear job displacement or perceive AI as threatening traditional teaching methods. This resistance could stem from a lack of understanding, misinformation, or concerns about algorithmic biases. To overcome resistance, universities must prioritize clear and effective communication about the purpose and benefits of AI tutorship. Transparent discussions with student-athletes and educators can address misconceptions and clarify how AI is a supportive tool rather than a replacement for human mentors.

AI algorithms work based on data analysis, and while they strive to provide personalized support, they might need to fully account for the nuances of individual preferences and learning styles. Some student-athletes may respond better to different teaching methodologies, which AI may not continuously adapt to effectively. To mitigate algorithmic biases, universities should regularly audit AI systems and actively involve diverse teams in their development. Ethical oversight and transparency in AI decision-making can ensure that the technology is used responsibly and equitably. Human interaction remains invaluable in providing emotional support and mentorship, and resistance to technology adoption may require proactive communication and education. Moreover, customizing AI experiences and addressing algorithmic biases are essential to ensuring that AI-driven support is tailored, fair, and inclusive. By acknowledging these limitations and challenges, universities can navigate the integration of AI effectively and create a harmonious balance between technology and human engagement, ultimately enhancing the educational journey of student-athletes. Acknowledge limitations and challenges associated with AI, such as the need for human interaction and potential resistance to technology adoption.

6. Future prospects and conclusion

We are convinced that future successful developments of artificial intelligence in tutoring student-athletes at university can be outlined in these key points:

1. AI tutorship will be able to devise personalized learning paths that will be tailored to each student-athlete's academic and athletic schedules, strengths, and weaknesses, allowing them to balance their responsibilities more effectively.
2. Adaptive content delivery will ensure the presentation of educational materials in formats preferred by student-athletes, optimizing their future learning experiences and knowledge retention.
3. Real-time performance tracking, utilizing wearable devices and data analytics, will be able to monitor student-athletes' physical and mental well-being and academic progress, enabling targeted support and adjustments.
4. AI tutorship will address skill development needs by analyzing sports performance data and providing personalized training plans and drills, complementing academic schedules.
5. Virtual reality and simulation-based training will offer immersive and safe practice environments, allowing student-athletes to refine decision-making skills and improve performance.
6. The integration of AI in student-athlete training will become paramount to fostering academic and athletic success. Student-athletes will face unique challenges in managing their time between sports commitments and academic responsibilities. AI tutorship systems will address these challenges by providing personalized learning paths and adaptive content delivery, allowing student-athletes to juggle both pursuits efficiently.
7. Real-time performance tracking will enable a holistic approach to student-athlete development, promoting overall well-being and facilitating timely support. AI tutorship will devise targeted skill development plans by analyzing sports performance data. This will allow student-athletes to excel in their sport without hindering their academic advancement.

8. The integration of virtual reality and simulation-based training will revolutionize student-athletes' preparation, offering risk-free and realistic scenarios for honing athletic skills and decision-making abilities. By leveraging these technologies, student-athletes will be able to achieve optimal performance while enriching their educational journey.

In conclusion, AI tutorship holds immense potential to transform university student-athletes' academic and athletic experiences. Personalized learning paths, adaptive content delivery, real-time performance tracking, personalized skill development, and virtual reality training are pivotal in maximizing student-athletes' potential.

By integrating more and more AI into student-athlete training, universities will foster an environment that nurtures academic excellence and athletic prowess. As this technology continues to evolve, universities should embrace AI tutorship to empower student-athletes with the tools they need to thrive both in their chosen sport and within the academic realm. Ultimately, the marriage of AI and student-athlete training will pave the way for a new era of success, ensuring that student-athletes can reach their full potential and make lasting contributions in their chosen fields.

7. References

- Conde, E., Meroño, L., Arias-Estero, J. L., García-Roca, J. A., Leiva-Arcas, A., Cánovas-Álvarez, F. J., Isidori, E., & Sánchez-Pato, A. (2021). Perception of the influence of the Estport model in the dual career of student-athletes in universities in Spain and Italy. *Cultura, Ciencia y Deporte*, 16(47), 31–37. <https://doi.org/10.12800/ccd.v16i47.1623>
- Conde, E., Martínez-Aranda, L. M., Leiva-Arcas, A., García-Roca, J. A., & Sánchez-Pato, A. (2023). Efficacy of European Sport Tutorship model (ESTPORT) in the dual career of athletes in Spain. *Journal of Human Sport & Exercise*, 18(1), 59–70. <https://doi.org/10.14198/jhse.2023.181.06>
- Dergaa, I., Chamari, K., Zmijewski, P., & Saad, H. B. (2023). From human writing to artificial intelligence generated text: Examining the prospects and potential threats of ChatGPT in academic writing. *Biology of Sport*, 40(2), 615–622. <https://doi.org/10.5114/biol sport.2023.125623>
- Dilekci, A., & Karatay, H. (2023). The effects of the 21st century skills curriculum on the development of students' creative thinking skills. *Thinking Skills and Creativity*, 47, 101229. <https://doi.org/10.1016/j.tsc.2022.101229>
- Finley, K. D. (2023). How to be “smart” about using artificial intelligence in the workplace. *Employee Relations Law Journal*, 49(1), 21–24.
- Halaweh, M. (2023). ChatGPT in education: Strategies for responsible implementation. *Contemporary Educational Technology*, 15(2), ep421. <https://doi.org/10.30935/cedtech/13036>
- Iliescu, D., Greiff, S., Ziegler, M., & Fokkema, M. (2022). Artificial intelligence, machine learning, and other demons. *European Journal of Psychological Assessment*, 38(3), 163–164. <https://doi.org/10.1027/1015-5759/a000713>
- Isidori, E. (2015). The dual career of student-athletes: A pedagogical challenge. *Cultura, Ciencia y Deporte*, 10(29), 99–101.
- Kasneji, E., Seßler, K., Küchemann, S., Bannert, M., Dementieva, D., Fischer, F., Gasser, U., Groh, G., Günemann, S., Hüllermeier, E., Krusche, S., Kutyniok, G., Michaeli, T., Nerdel, C., Pfeffer, J., Poquet, O., Sailer, M., Schmidt, A., Seidel, T., & Kasneji, G. (2023). ChatGPT for good? On opportunities and challenges of large language models for education. *EdArXiv Preprint*. <https://doi.org/10.35542/osf.io/5er8f>
- Passmore, J., & Tee, D. (2023). Can Chatbots replace human coaches? Issues and dilemmas for the coaching profession, coaching clients and for organizations. *Coaching Psychologist*, 19(1), 47–54.
- Saqib, H., Al-Hashmi, S. H., Mazhar, H. M., & Syed Imran, A. K. (2023). Chatbot in E-learning. *SHS Web of Conferences*, 156, 1-6. <https://doi.org/10.1051/shsconf/202315601002>

- Shaw, D., Morfeld, P., & Erren, T. (2023). The (mis)use of ChatGPT in science and education: Turing, Djerassi, "athletics" & ethics. *EMBO Reports*, 24(7), e57501. <https://doi.org/10.15252/embr.202357501>
- Zhou, L. (2021). Combination of ideological and political education and artificial intelligence in the cultivation of sports talents in colleges and universities in China. *Journal of Shenyang Sport University*, 40(5), 40–45.
- Zhu, C., Sun, M., Luo, J., Li, T., & Wang, M. (2023). How to harness the potential of ChatGPT in education? *Knowledge Management & E-Learning*, 15(2), 133–152. <https://doi.org/10.34105/j.kmel.2023.15.008>